REMARKS/ARGUMENTS

I.   Introduction

This amendment is submitted in response to the Final Office action dated October 17, 2005. The specification has been amended to correct typographical errors, and in response to the Examiner's objections. Claims 15-21 were previously canceled. Claims 1, 8 and 10 has been amended in the current response. Claims 1 and 10 were amended to address antecedent basis issues and to clarify the claims while claim 8 was amended to rewrite the claim in independent form. As part of the amendment to claim 1, the indentation used on the last three elements of claim 1 has been revised to clarify the claim. No new matter has been added to the specification or claims.

The Election/Restrictions requirement has been maintained by the Examiner and was made FINAL.

Accordingly, Claims 1-14 are now pending.

The drawings stand objected to as failing to comply with 37 CFR 1.84(p)(5) for failure of inclusion of references. Except for Examiner's second objection (reference 529 in figure 5), the references have been corrected in the specification. Therefore, there is no need to amend the drawings. Reference 529 of figure 5 was objected to because the Examiner believed it was not described in the specification. Applicant respectfully contends that it is described on p. 30, line 12 of the specification. Accordingly, the objection should be withdrawn.

Regarding claim 10, the Examiner found insufficient antecedent basis for the limitation "said average flow rate" in the claim. Claim 10 has been amended to correct this problem.

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Claim 11 stands rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claims 1-5, 11, and 14 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. US 2003/0035370 A1 to Brustoloni (hereinafter "the Brustoloni publication"). In addition, claims 6, 7, 12, and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Brustoloni publication in view of U.S. Patent Application Publication No. US 2002/0105908 A1 to Blumer et al. (hereinafter "the Blumer et al. publication").

Claims 8-10 are allowed. Applicant thanks the Examiner for this allowance. Claim 8 was rewritten in independent form given the indication that it was allowable.

Applicant will now address and overcome each of the Examiner's rejections after summarizing the invention.

II.   Summary of the Invention

The present invention is directed to the provision of a mechanism for use in defending against flooding network denial of service attacks. Generally, for the claims at issue here, this involves examining packets in a flow, determining whether the protocol of the packets is one that should be responsive to congestion signaling (such as TCP), or is not such a protocol (such as a "best-effort" protocol, like UDP). Then, if the protocol should be responsive to congestion signaling, determining whether the system does appropriately respond. If it doesn't respond appropriately, the packets are dropped. If the system does appropriately respond, then those packets, **along with packets using a protocol that is generally not responsive to congestion signaling, are** compared to historic similar flows, and packets are dropped if the flows exceed historic flow rates.

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III.   Summary of the Brustoloni publication reference

The Brustoloni publication discloses protecting a site from denial of service attacks by seeing if the incoming traffic conforms to a user-supplied profile (such as protocol type, acceptable destination port numbers, maximum transmission rate, maximum number of allowed connections, and whether to enforce congestion-avoidance). Further, packets may be forwarded in multiple classes of service, depending on the type of traffic (Abstract).

The Brustoloni publication recognizes that enforcing congestion-avoidance may be problematic. One approach discussed is to utilize "ingress filtering" (paragraph 0029), which involves checking a packet at the origination end to ensure that it is properly addressed. Another is to avoid "spoofing acknowledgements" by using SPE units, installed in the network for this purpose, to utilize a challenge-response system (paragraph 0030). This approach entails sending messages between the SPE units, to see whether the coded response is correct. If the response is incorrect, the traffic is blocked.

Where ingress filtering and an SPE unit architecture are not available, the Brustoloni publication calls for segregating all such packets in a separate class of service (paragraph 0041). In this way, the traffic which is screened by either ingress filtering or by the use of SPE units can be placed in a different class of service than those packets for which no screening can be accomplished. Therefore, denial of service attacks would only affect packets in the "unprotected" class of service. To put it another way, the Brustoloni publication recognizes a class of traffic that it can't handle regarding denial of service attacks, and simply puts such traffic in its own class, to limit its potential damage.

As will be discussed below, the present invention differs significantly from the Brustoloni publication by including various features such as "determining if the packets in the flow correspond to a communications protocol which is responsive

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to congestion signaling" in combination with the step of "when said flow is determined to include packets corresponding to a communications protocol which is responsive to congestion signaling: *determining if the flow performs in a manner indicating that the flow is responsive to congestion signaling*". Such a combination of features is not taught by the Brustoloni publication.

IV.   The Rejection of Claim 11 35 U.S.C. 112, second paragraph, as being indefinite

The Examiner states that claim 11 is indefinite because "the word 'non-responsive' contradicts claim 1 and the inventive concept as described in the application." Applicant respectfully disagrees.

Claim 1 (which claim 11 depends from) discloses the method of determining whether packets in a flow correspond to a communications protocol which is responsive to congestion signaling. Claim 1 then discloses that if the flow is determined to include packets corresponding to a communications protocol which is responsive to congestion signaling and it is determined that the flow "performs in a manner indicating that the flow is responsive to congestion signaling", it is forwarded. However, if a flow which is determined to include packets corresponding to a communications protocol which is responsive to congestion signaling and the flow performs "in a manner indicating that it is non-responsive to congestion signaling", it is blocked. Thus, a check is made to determine if the flow is responding to congestion signaling as it should and it is blocked if it is not responding appropriately.

Claim 11 discloses an "additional flow", i.e., a flow in addition to the flow recited in claim 1, for which it is determined that the protocol is not one that is responsive to congestion signaling (as opposed to the protocol of the flow in claim 1, in which the protocol may be responsive to congestion signaling). Since the protocol of the additional flow is not responsive, in the method recited in claim 11, at least

some of the packets in the additional flow are forwarded. There is no contradiction between claims 1 and 11.

V.   The Rejection of Claims 1-5, 11, and 14
under 35 U.S.C. §102(e) Based on the Brustoloni publication

Regarding claim 1, the Brustoloni publication does not teach or suggest the step of "determining if the packets in the flow correspond to a communications protocol which is responsive to congestion signaling". First, as discussed above, the Brustoloni publication does not distinguish between protocols that are or are not responsive to congestion signaling. The only teaching regarding "congestion signaling" in the Brustoloni publication relates to a "challenge-response" system of SPE's, as described at paragraph 0030.

Second, even if the Brustoloni publication did determine that a protocol was responsive to congestion signaling, the reference does not teach or suggest "determining if the flow performs in a manner indicating that the flow is responsive to congestion signaling". The Brustoloni publication does not teach or suggest any determination of the performance of any flows, other than to see if the flow matches the profile established by the user (paragraph 0033).

Third, the Brustoloni publication does not teach "blocking the packets from said flow when said flow is determined to perform in a manner indicating that it is non-responsive to congestion signaling" (claim 1 of the present invention), since the Brustoloni publication does not determine whether the flow is non-responsive.

For at least these reasons, claim 1, and claims 2-5, 11, and 14 which depend therefrom, are not rendered unpatentable by the Brustoloni publication. Claim 1 is patentable because it recites, among other things, the features indicated in bold below:

> A method of controlling a network node to process a plurality of packet flows, the method comprising:

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receiving packets corresponding to a flow;

determining if the packets in the flow correspond to a communications protocol which is responsive to congestion signaling;

when said flow is determined to include packets corresponding to a communications protocol which is responsive to congestion signaling:

determining if the flow performs in a manner indicating that the flow is responsive to congestion signaling;

forwarding at least some received packets corresponding to the flow when it is determined that the flow performs in a manner indicating that it is responsive to congestion signaling; and

blocking the packets from the flow when the flow is determined to perform in a manner indicating that it is non-responsive to congestion signaling.

Further regarding claim 3, in addition to the above arguments, claim 3 includes: "monitoring a flow rate of said flow to determine if the monitored flow rate decreases in response to congestion signaling." First, the Brustoloni publication does not teach or suggest performing "congestion signaling". Second, the Brustoloni publication does not teach monitoring the rate of a flow to determine if it decreases, for any reason. For these additional reasons, claim 3, and claims 4-5 which depend therefrom, are patentable over the Brustoloni publication.

Claim 3 recites, and is further patentable because of the features indicated in bold:

The method of claim 1, wherein determining if the flow performs in a manner indicative of responsive to congestion signaling includes:

monitoring a flow rate of said flow to determine if the monitored flow rate decreases in response to congestion signaling.

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VI.   **The Rejection of Claims 6, 7, 12, and 13 under 35 U.S.C. §103(a) based on the Brustoloni publication in view of the Blumer et al. publication**

For the reasons discussed above, claim 1, and therefore **claims 6, 7, 12, and 13**, which depend therefrom, are not rendered unpatentable over the Brustoloni publication.

The Blumer et al. publication discloses apparatus for utilizing a buffer to store, forward, and discard packets based on the probability that the packets will be dropped (paragraph 0013). There is no teaching or suggestion of "determining if the packets in the flow correspond to a communications protocol which is responsive to congestion signaling". There is also no teaching or suggestion of "determining if the first flow performs in a manner indicative of responsive to congestion signaling". Lastly, there is no teaching or suggestion of "blocking the packets from said flow when said first flow is determined to perform in a manner indicating that it is non-responsive to congestion signaling".

Therefore, there is no combination of the Brustoloni publication and the Blumer et al. publication which would render any of the pending claims of the present invention unpatentable. **It is therefore respectfully requested that the pending claims 1-14 proceed to issue.**

VII.   **Conclusion**

In view of the foregoing remarks, Applicant respectfully submits that the pending claims are in condition for allowance. Accordingly, Applicant requests that the Examiner pass this application to issue.

If there are any outstanding issues which need to be resolved to place the application in condition for allowance the Examiner is invited to contact

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Applicant's undersigned representative by phone to discuss and hopefully resolve said issues. To the extent necessary, a petition for extension of time under 37 C.F.R. 1.136 is hereby made, the fee for which should be charged to Patent Office deposit account number 07-2347.

Respectfully submitted,

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Joel Wall, Attorney
Reg. No. 25,648
Tel.: (972) 718-4800

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